IN THE CLAIMS:

The following is a complete listing of the claims in this application, reflects all changes currently being made to the claims, and replaces all earlier versions and all earlier listings of the claims:

1. (Currently Amended) A method ~~adapted~~ for setting an area in a radiation image ~~obtained by radiographing an object,~~ comprising ~~the steps of~~:

~~deleting a passing through area from the radiation image;~~

~~preparing a projection of the image obtained in said deleting step;~~

~~and~~

a discriminating step, of discriminating, in the radiation image, an area where X-rays are directly irradiated on an X-ray detection means without passing through an object, as a passing-through area;

an object discriminating step, of discriminating an area obtained by eliminating the area discriminated as the passing-through area in said discriminating step from the radiation image, as an object image;

a calculating step, of calculating a projection from the object image discriminated in said object discriminating step; and

a setting step, of setting an area in the radiation image based on the projection.

2. (Currently Amended) A method according to claim 1, further comprising a step of binarizing the object image ~~obtained in said deleting step~~, wherein in said ~~preparing~~ calculating step, the projection of the binarized object image is prepared.

3. (Currently Amended) A method according to claim 1, ~~wherein in said preparing step, a weighting processing is performed based on a pixel value of the image~~ further comprising the step of obtaining a weighted image by weighting the object image with its pixel value, wherein in said calculating step, the projection of the weighted image is prepared.

4. (Currently Amended) A method according to claim 1, ~~wherein in said preparing step, a weighting processing is performed based on a pixel position of the image~~ further comprising the step of obtaining a weighted image by weighting the object image with coordinates of its pixel value, wherein in said calculating step, the projection of the weighted image is prepared.

5. (Previously Presented) A method according to claim 1, wherein in said setting step, the area is set based on secondary difference values of the projection.

6. (Previously Presented) A method according to claim 1, wherein the object includes a cervical vertebra.

7. (Previously Presented) A method according to claim 1, further comprising the steps of:

extracting a pixel value characteristic from the area; and

performing a gradation conversion processing of the radiation image based on the pixel value characteristic.

8.-15. (Canceled)

16. (Currently Amended) An apparatus ~~adapted~~ for setting an area in a radiation image ~~obtained by radiographing an object,~~ comprising:

~~a deleting unit, adapted to delete a passing through area from the radiation image;~~

~~a preparing unit, adapted to prepare a projection of the image obtained by said deleting unit; and~~

a discrimination unit, adapted to discriminate, in the radiation image, an area where X-ray are directly irradiated on an X-ray detection means without passing-through an object, as a passing-through area;

an object discrimination unit, adapted to discriminate an area obtained by eliminating the area discriminated as the passing-through area by said discriminating unit from the radiation image, as an object image;

a calculation unit, adapted to calculate a projection from the object image discriminated by said object discrimination unit; and

a setting unit, adapted to set an area in the radiation image based on the projection.

17. and 18. (Canceled)

19. (Currently Amended) A storage medium storing a program which includes codes for causing a computer to execute steps of a method adapted for setting an area in a radiation image ~~obtained by radiographing an object~~, the method comprising ~~the steps of:~~

~~deleting a passing-through area from the radiation image;~~

~~preparing a projection of the image obtained in said deleting step;~~

~~and~~

a discriminating step, of discriminating, in the radiation image, an area where X-rays are directly irradiated on an X-ray detection means without passing-through an object, as a passing-through area;

an object discriminating step, of discriminating an area obtained by eliminating the area discriminating as the passing-through area in said discriminating step from the radiation image, as an object image;

a calculating step, of calculating a projection from the object image discriminated in said object discrimination step; and

a setting step, of setting an area in the radiation image based on the projection.

20.-33. (Canceled)

34. (New) A method according to claim 1, wherein said discriminating step further comprises the steps of:

calculating a value representative of the passing-through area, and

discriminating pixels equal to or higher than the calculated representing value and pixels within a certain distance from the pixels, as the passing-through area.

35. (New) A method for setting an area in a radiation image,

comprising:

a contour line extracting step, of calculating a contour line of an object image from the radiation image;

a projection calculating step, of calculating a sum total of pixel values by adding the pixel values of pixels included in an area linearly connecting from the contour line of one side to the contour line of the other side in a predetermined direction;

an average pixel value calculating step, of calculating an average pixel value by dividing the sum total by the total number of the pixels used for calculating the sum total; and

a setting step, of setting an area in the radiation image based on the average pixel value.

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36. (New) An apparatus for setting an area in a radiation image, comprising:

a contour line extracting unit, adapted to calculate a contour line of an object image from the radiation image;

a projection calculating unit, adapted to calculate a sum total of pixel values from pixels included in an area linearly connecting from the contour line of one side to the contour line of the other side in a predetermined direction;

an average pixel value calculating unit, adapted to calculate an average pixel value by dividing the sum total by the total number of the pixels used for calculating the sum total; and

a setting unit, adapted to set an area in the radiation image based on the average pixel value.

37. (New) A storage medium storing a program which includes codes for causing a computer to execute steps of a method adapted for setting an area in a radiation image, the method comprising:

a contour line extracting step, of calculating a contour line of an object image from the radiation image;

a projection calculating step, of calculating a sum total of pixel values from pixels included in an area linearly connecting from the contour line of one side to the contour line of the other side in a predetermined direction;

an average pixel value calculating step, of calculating an average pixel value by dividing the sum total by the total number of the pixels used for calculating the sum total; and

a setting step, of setting an area in the radiation image based on the average pixel value.

38. (New) A radiographing apparatus having a gradation conversion function, comprising:

an X-ray radiation unit, adapted to radiate X-rays;

a sensor, adapted to convert X-rays irradiated by said X-ray radiation unit into a radiation image signal;

a discriminating unit, adapted to discriminate, in a radiation image, an area where X-rays are directly irradiated on said sensor without passing-through an object, as a passing-through area;

an object extracting unit, adapted to discriminate an area obtained by eliminating the area discriminated as the passing-through area by said discriminating unit

from the radiation image, as an object image;

a projection calculating unit, adapted to calculate a projection from the object image discriminated by said object extracting unit; and

a setting unit, adapted to set an area in the radiation image based on the projection.

39. (New) A radiographing apparatus having a gradation conversion function, comprising:

an X-ray radiation unit, adapted to radiate a radiation ray;

a sensor, adapted to convert X-rays radiated by said X-ray radiation unit into a radiation image signal;

a contour line extracting unit, adapted to calculate a contour line of an object image from a radiation image represented by the radiation image signal;

a projection calculating unit, adapted to calculate a sum total of pixel values from pixels included in an area linearly connecting from the contour line of one side to the contour line of the other side in a predetermined direction;

an average pixel value calculating unit, adapted to calculate an average pixel value by dividing the sum total by the total number of the pixels used for calculating the sum total; and

a setting unit, adapted to set an area in the radiation image based on the average pixel value.

40. (New) A method according to claim 35, wherein said contour line extracting step further comprises:

a step of calculating a value representative of the passing-through area;

a step of discriminating pixels equal to or higher than the calculated representing value and pixels within a certain distance from the pixels, as the passing-through area; and

an object extracting step, of extracting the area not discriminated as the passing-through area, as an object area.